10/526032
BT01 Rec'd PCT/PT 28 FEB 2005

(currently amended) 1. A Structure of an electrode of electrically conducting material for use ~~as an anode and/or a cathode~~ in an electrolytic cell, ~~and~~ comprising:

a spacer means to prevent electrical contact between electrodes when used, and being arranged for through flow conducting of a process liquid~~, such as water,~~ to be treated, ~~characterized by,~~

a conductive frame ~~(10)~~ having a number of liquid through flow openings ~~(18)~~ and including means ~~(20)~~ for connection to a current supply, wherein one or both plane sides of the frame ~~(10)~~ is covered with a conductive perforated foil or a wire mesh ~~(12,14)~~, and

wherein the spacer means ~~(16)~~ is a perforated foil or wire mesh being adapted to cover one of the plane surfaces of the perforated foil or ~~a~~ wire mesh ~~(12,14)~~, and the plane section of said perforated ~~spacer~~ foil or wires mesh corresponds mainly to the plane section of the frame ~~(10)~~.

(currently amended) 2. The Structure of an electrode according to claim 1, characterized in that the wire mesh ~~or wire mesh net (12,14)~~ includes parallel threads ~~were~~where each tenth or twentieth threads is of tantalum while the intermediate threads are of platinum.

(currently amended) 3. The Structure according to claim 1~~claims 1-3~~, characterized in that the wires of the wire mesh ~~(12,14)~~ are individually from 100 microns to 25000 microns apart, and when they are woven, knitted, induction-welded or plaited into mesh, have an air aperture of from 15 microns to 25000 microns.

(currently amended) 4. The Structure according to claim 1~~any of preceding claims~~, characterised in that each wire of the wire mesh has a diameter in a range of 0.010 mm to 5 mm.

(currently amended) 5. The Structure according to claim 1~~any of preceding claims~~, characterized in that the foil or ~~a~~ wire mesh ~~(12,14)~~ is formed of tantalum, niobium, hafnium, zirconium, platinum, rhodium, iridium, ruthenium, palladium or any alloy of these, or of an alloy or ~~an~~ a composition of wires of the different aforementioned metals.

(currently amended) 6. The Structure according to claim 1~~any of preceding claims~~, characterized in that the perforated foil ~~electrode (12,14) consists~~ is comprised of a plate in SS316L or higher alloy metal, and which is ~~closely~~ perforated by photochemistry.

(currently amended) 7. The Structure according to claim 1~~any of preceding claims~~, characterized in that ~~the through-flow~~ through flow openings ~~(18)~~ of the spacer means ~~(16)~~ are aligned with ~~the~~ through flow openings ~~(18)~~ of the frame ~~(10)~~.

(currently amended) 8. The Structure according to any of preceding claims, characterized in that the ~~spacer~~ perforated foil ~~(16)~~ is a PVC or polypropylene sheet and is welded to the frame ~~(10)~~.

(currently amended) 9. The Structure according to claim 1~~any of preceding claims~~, characterized in that the thickness of the frame ~~(10)~~ is ~~about~~ approximately 5 mm.

(currently amended) 10. The Structure according to claim 1~~of electrode according to any of preceding claims~~, characterized in that the frame ~~(20)~~ is covered with a non oxidizable material ~~in order~~ to protect against contact with ~~the mentioned~~ said process liquid.

(currently amended) 11. The Structure according to claim 1~~any of preceding claims~~, characterized in that the perforated foil thickness is from 25-1000 microns and diameter of each perforation of said perforated foil is from 25-2000 microns.

(currently amended) 12. A Method for preparing the structure of an electrode according to claim 1, characterized in that sheets of perforated foil or wire mesh ~~sheets (12,14,16)~~ are anchored to ~~the~~ a frame surface ~~(10)~~, comprising the steps of:

~~by~~ subjecting ~~the~~ a sheet of perforated foil or wire mesh ~~sheets~~ to a stretch or tension force, and ~~then being~~

forc~~ed~~ing against and fix~~ed~~ing to the frame surface the sheet of perforated foil or wire mesh. ~~by means of a welding and/or adhesive operation.~~

(currently amended) 13. The Method ~~according to~~ of claim 12, characterized in that the sheets of perforated foil or wire mesh ~~sheets (12,14,16)~~ are anchored to the frame ~~(10)~~ :

by adhesive operation,

by friction welding,

by laser welding, or ~~preferably~~

by use of ~~pressure/heat~~ pressure or heat and bonding and exposing the foil or wire mesh to ~~said~~ sufficient tension force.

(currently amended) 14. A method for using ~~Use of~~ the electrode structure of claim 1~~according to claims 1-11~~, in an electrolytic cell ~~where single electrodes according to said claims are~~, comprising the steps of:

stack~~ed~~ing and interconnect~~ed~~ing said electrode structures to form ~~anode/cathode~~ pairs of anodes and cathodes ~~in numbers from one and up to 50 altogether~~ inside a pipe, ~~for~~

conducting liquids through said pipe,

processing liquids ~~of liquids/water~~ being conducted through the ~~electrode pairs of the cell~~ paired electrode structures in the pipe, and

applying ~~in that~~ a current ~~is applied~~ to each pair of anode and cathode electrode structures.

(currently amended) 15. The method of claim 14 ~~Use of electrode structure according to claim 14 in an electrolytic cell processing liquids/water where the anode and cathode is of identical material or different, and in case of similar material~~, wherein a direct current DC power is applied ~~might be~~ alternatel~~y~~yd to avoid scaling and uneven tear and wear in the case where the anode and cathode are similar materials.

(cancelled) 16.

(currently amended) 17. The method of claim 14 ~~Use of electrode structure according to claims 14-16 in an electrolytic cell processing liquids/water in that a typical current density at 316L anodes is 38 mA/cm2 provided a Cl content at 5 ppm, and for noble metals the current is 270 Amp at an anode area of 0,5 cm2, and~~, wherein the distance between ~~the~~ an anode

surface of one electrode structure ~~unit~~ and ~~the~~ a cathode surface of the neighboring electrode structure ~~unit~~ may be approximately ~~about~~ 0,3 mm.

(currently amended) 18. The method of claim 14 ~~Use of anode and cathode according to the preceding claims 14-17, in an electrolytic cell, for~~ , further comprising the step of producing ~~production of~~ oxidants through electrolysis, for oxidation of organic material in liquids, and organic material on particles in liquids.

(currently amended) 19. The method of claim 14 ~~Use of anode and cathode according to the preceding claims 14-18, in an electrolytic cell, for~~, further comprising the step of producing ~~production of~~ oxidants through electrolysis, for oxidation and destruction of bacteria, spores, micro-organisms, algae and virus in liquids.

(currently amended) 20. The method of claim 19 ~~Use of anode and cathode according to the preceding claims 14-19, in an electrolytic cell~~, wherein said step of producing ~~for production of~~ oxidants through electrolysis~~,~~ is for treatment of fresh water and drinking water by conducting polluted liquids through flow openings of said electrode structure.

(cancelled) 22.

(currently amended) 23. The method of claim 19 ~~Use of anode and cathode according to the preceding claims 14-22, in an electrolytic cell~~, wherein said step of producing ~~for production of~~ oxidants through electrolysis~~,~~ is for destruction of virus, spores and bacteria, and micro organisms, algae and algal cysts smaller than 100 microns in ballast water from ships.

(currently amended) 24. The method of claim 14 ~~Use of anode and cathode according to the preceding claims 14-23~~, wherein the liquid that is being treated, before it is treated ~~according to the invention~~, is directed through a mechanical particle extractor ~~in order~~ to remove all particles and organisms larger than light aperture in the electrode structure.